Typha (Cattail) Invasions in the Great Lakes Region:
Why Is It Happening and What Can We Do About It?

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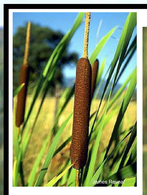
Typha Ecology in Great Lakes Region



Typha latifolia

Broad-leaved Cattail

- Native species
- Native in all 9 Great Lakes parks

Typha angustifolia

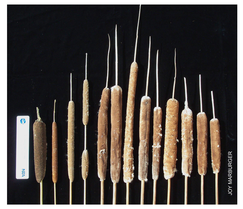
Narrow-leaved Cattail

- Introduced from Europe in mid to late 1800s
- Reported in all parks except GRPO and ISRO

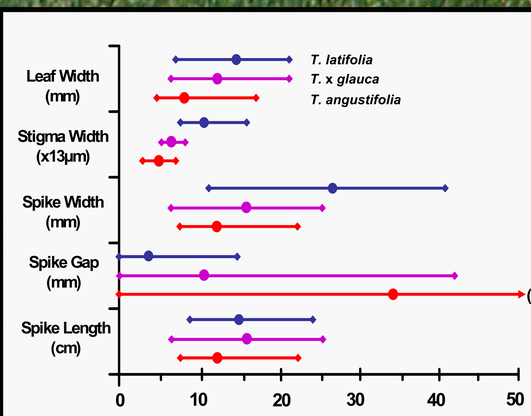
Typha* x *glauca

Hybrid Cattail

- Hybrid of parent species
- Reported in APIS, INDU, MISS, SACN, VOYA but likely present in SLBE and PIRO

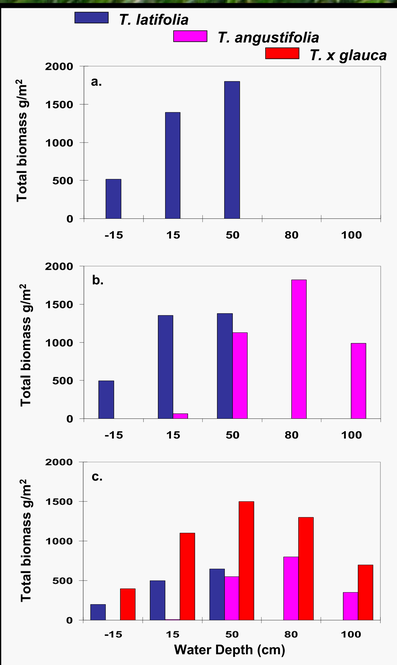


The coexistence of 2 parent species and the F1 hybrid can lead to advanced generation hybrids through back-crossing. The result can be hybrid swarms that overlap morphologically and ecologically (e.g., inflorescence spike characters in photo).



Mean (cirles) and range (lines) of morphological features of 153 genetically identified individuals of *Typha* spp from across n. North America (from Marcinko Kuehn and White 1999).

Note that ranges of values for parent species overlap with *T. x glauca* for all 5 characters presented here.



Total biomass production (g/m^2) by water depth for:

a.) *T. latifolia* growing alone,

b.) *T. latifolia* and *T. angustifolia mixture*

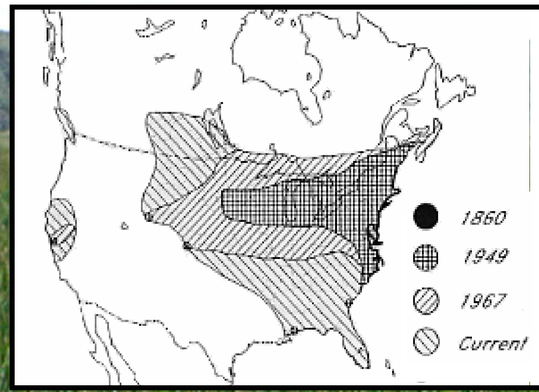
c.) *T. latifolia, T. angustifolia,* and *T.* x *glauca* mixture.

Total biomass produced at various depths increases with addition of species.

Also, total site biomass increases as species fill different depth niches

Biomass estimates for b.) are from Grace and Wetzel (1982) for a wetland complex in northern Michigan. Production of *T. latifolia* alone (a.) and in mixture with other 2 species (c.) are derived from Grace and Wetzel (1982) and A.A. Snow (unpublished data).

The Invasion Process



Range expansion of *T. angustifolia* in North America (from Galatowitsch et al. 1999). Appearance of hybrids between native *T. latifolia* and *T. angustifolia* may lag behind the introduction of *T. angustifolia* by up to 20 years or more.

E.g., Grace and Wetzel (1982) report no intermediate types during research conducted in n. Michigan in the 1970s.

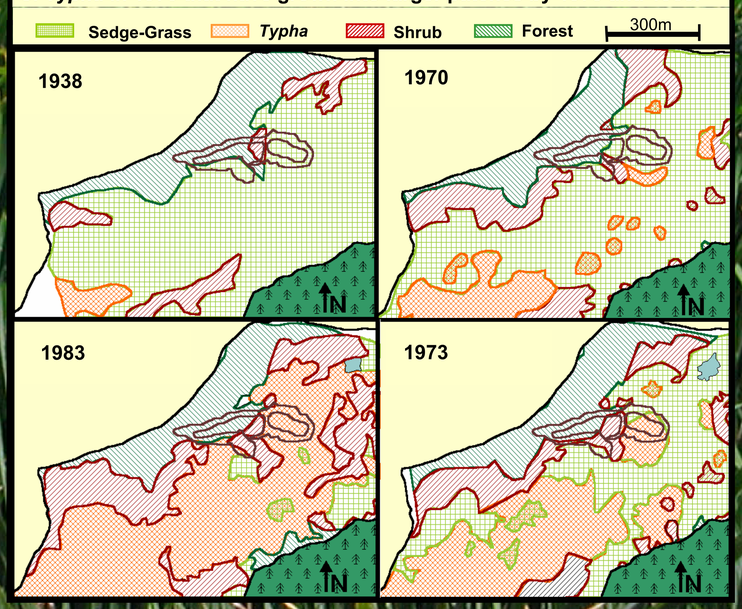
Causes of *Typha* Invasions

1. Increased availability of N or P (e.g., from runoff, sewage, etc)
2. Change in surface hydrology
3. Change in fire regime
4. Introduction of *T. angustifolia or T.* x *glauca*

Effects of *Typha* Invasions

1. Decrease in native species richness and diversity
2. Change in nutrient cycling
3. Change in above- and below-ground biomass dynamics
4. Change in surface hydrology

Typha spp. are capable of rapidly invading wetlands. This series of maps (interpreted from aerial photos) documents the dramatic expansion of *Typha* in Cowles Bog, Indiana Dunes National Lakeshore from 1938-1983 (clockwise). Most of this expansion comes at the expense of native sedge/grass habitat. Note the single patch of *Typha* in the southwest corner of the bog in 1938. Note also the "leapfrogging" of small patches of *Typha* in 1970 that have grown into larger patches by 1973 and 1983.



Management Options

Technique	Advantages	Disadvantages	Relative Cost
Water Level Modification	•Flooding or draining followed by burning can dramatically reduce densities n 2 years •Least expensive method	•Must be 3-4' (1m+) above new shoots for extended periods to kill plants •Not possible in most natural systems	Low
Cutting/ Shearing/ Discing	•Can be effective when combined with flooding and/or prevention of seedling establishment during 1st 3 weeks of growth	•Must be combined with other methods •Heavy equipment causes excessive soil disturbance	Med to High
Prescribed Burning	•Fire in combination with flooding can be effective in early spring	•Fire alone does not provide any control and may actually stimulate growth	Med to High
Chemical Control	•Most effective method •Aerial spraying can cover large areas	•May not be appropriate for some natural areas due to non-target effects	High (>$100/ac)

A patch of *Typha* spp. sprayed (left) and untreated (right). Spraying is the best control method when flooding is not an option. By leaving litter in place, *Typha* seedlings are repressed enough to allow planted natives to compete. *Typha* seedbanks can also be depleted or eliminated by spraying annually for 3-4 years.

Carex sp. (sedge) planting in litter of patch of *Typha* that was cut then sprayed. Densities of plantings necessary to outcompete *Typha* ranged from $6/m^2$ for more than $20/m^2$, depending on the species, at INDU. Plants that spread vegetatively, like *C. lacustris*, typically require lower densities and therefore cost less to establish.

A patch of restored sedges 2 years after planting. Natural reestablishment of native grasses and forbs is generally poor when *Typha* has been present for long periods. Results of direct seeding are mixed; e.g., does not work well for sedges but does for some species of *Scirpus.*

BACKGROUND PHOTO: COWLES BOG, INDU by